

Anushrut's Theory: Magnetically-Assisted Vehicle

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Abstract

Anushrut's Theory proposes a wheel-less, magnetically-assisted vehicle that reduces friction and electrical energy consumption by combining passive magnetic repulsion with controlled electromagnetic pulses. Permanent magnets mounted on the vehicle and aligned with a magnetic track generate repulsive lift, reducing the effective normal force and thus friction. Short, controlled bursts of current to front or rear electromagnets provide bidirectional propulsion only when needed. This document presents the motivation, background, theoretical mechanism, core equations, a working model description, testable predictions, limitations, and references to support further experimental validation.

1 Introduction

Conventional vehicles lose energy through rolling friction, mechanical wear, and continuous propulsion demands. Even electric vehicles experience rolling resistance, and advanced friction-reduction systems often require complex infrastructure. The motivation of this project is to demonstrate a simpler, small-scale experimental approach where magnetic forces reduce friction and electricity is used only in short pulses for motion control. This can support research into low-friction transport, robotics, and future maglev-inspired designs.

2 Background

Maglev transportation systems reduce friction by levitating vehicles above a guideway using magnetic forces, and linear motor technologies provide propulsion along the track. Hyperloop concepts further reduce drag using low-pressure tubes. However, many existing systems require continuous electrical power, complex control, and costly infrastructure. Anushrut's Theory focuses on a simpler prototype-scale concept emphasizing passive lift using permanent magnets and pulsed electromagnetic control for propulsion.

3 Conceptual Framework of Anushrut's Theory

Anushrut's Theory combines:

- **Passive magnetic lift:** Permanent magnets placed at the vehicle's front and rear (like poles facing outward) repel magnets embedded in a fixed magnetic track, producing lift without continuous electricity.

- **Pulsed electromagnetic propulsion:** Small electromagnets at the front and rear receive short electrical pulses from a battery and controller. Pulsing the rear electromagnet produces forward thrust; pulsing the front electromagnet produces backward thrust.

This approach reduces friction through magnetic lift while maintaining controllable motion through intermittent electrical input.

4 System Architecture and Working Principle

4.1 Magnetic Repulsion (Lift)

When vehicle magnets interact with track magnets, a repulsive force partially counteracts gravity:

$$F_{\text{repulsion}} \propto \frac{\mu_0 \cdot m_1 \cdot m_2}{4\pi r^2} \quad (1)$$

where m_1, m_2 are magnetic moments, r is separation distance, and μ_0 is the permeability of free space.

This reduces effective normal force:

$$N = mg - F_{\text{repulsion}} \quad (2)$$

Therefore friction is reduced:

$$F_{\text{friction}} = \mu N \quad (3)$$

4.2 Electromagnetic Propulsion

Electromagnets generate thrust when current flows:

$$F_{\text{electro}} = I \cdot L \cdot B \quad (4)$$

where I is current, L is effective coil length, and B is magnetic flux density.

Forward motion: pulse rear electromagnet.

Backward motion: pulse front electromagnet.

4.3 Net Motion

$$F_{\text{net}} = F_{\text{electro}} - F_{\text{friction}} - F_{\text{drag}} \quad (5)$$

$$a = \frac{F_{\text{net}}}{m_{\text{vehicle}}} \quad (6)$$

5 Working Model

5.1 Prototype Diagram

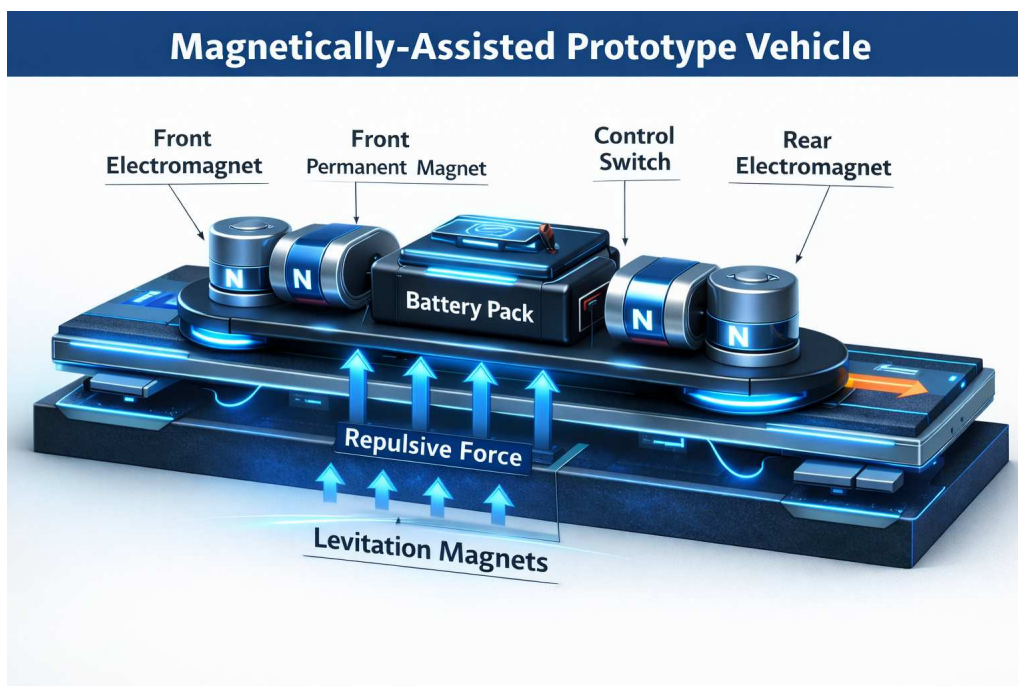


Figure 1: 3D schematic of the magnetically-assisted vehicle (Anushrut's Theory).

5.2 Components

Table 1: Core components of the working model

Component	Function
Permanent Magnets (Front & Rear)	Lift and reduce friction
Electromagnets (Front & Rear)	Provide pulsed propulsion
Battery Pack	Powers electromagnets
Control Switch / Arduino	Directs current to front/rear
Magnetic Track	Provides fixed reference and guidance

5.3 Operation Steps

1. Place vehicle on the magnetic track; permanent magnets generate lift.
2. Apply current to rear electromagnet $\rightarrow$ forward motion.
3. Apply current to front electromagnet $\rightarrow$ backward motion.
4. Adjust pulse timing to control speed and stopping.

6 Performance Expectations

1. With magnetic lift active, measured friction will be lower than in a non-lift condition.
2. Pulsed propulsion will consume less electrical energy than continuous propulsion.
3. Increasing permanent magnet strength will increase lift height and reduce friction.
4. Lower vehicle mass will improve lift efficiency and motion performance.

7 Limitations

- The theory is currently validated at prototype scale.
- Magnetic systems require careful stability design.
- Open-air operation limits maximum speed due to air drag.
- Precise pulse control is necessary for smooth operation.

8 What is Anushrut's Theory?

Anushrut's Theory is a conceptual framework for a wheel-less, magnetically-assisted vehicle that achieves motion by combining passive magnetic lift with controlled, pulsed electromagnetic propulsion. The theory states that permanent magnets can be used to generate continuous repulsive lift against a magnetic track without consuming electrical energy, thereby reducing normal force and mechanical friction. Directional motion is achieved by applying short, timed electrical pulses to electromagnets placed at the front and rear of the vehicle. These pulses interact with the track's magnetic field to produce thrust only when motion or direction change is required. By eliminating wheels and avoiding continuous power usage, Anushrut's Theory emphasizes energy efficiency, reduced mechanical wear, and simplified experimental investigation of low-friction transportation systems.

9 Conclusion

Anushrut's Theory demonstrates an energy-efficient motion concept by combining passive magnetic repulsion with pulsed electromagnetic propulsion. The approach eliminates wheels, reduces friction, and minimizes continuous power usage. While currently suited for small-scale experimental validation, the theory provides a strong foundation for future research in magnetically-assisted transportation systems.

10 References

1. Halliday, D., Resnick, R., & Walker, J. *Fundamentals of Physics*. Wiley.
2. Post, R. F. *Magnetic Levitation and Propulsion Concepts*.

3. Ross, P. E. "Hyperloop: No Pressure." *IEEE Spectrum*.

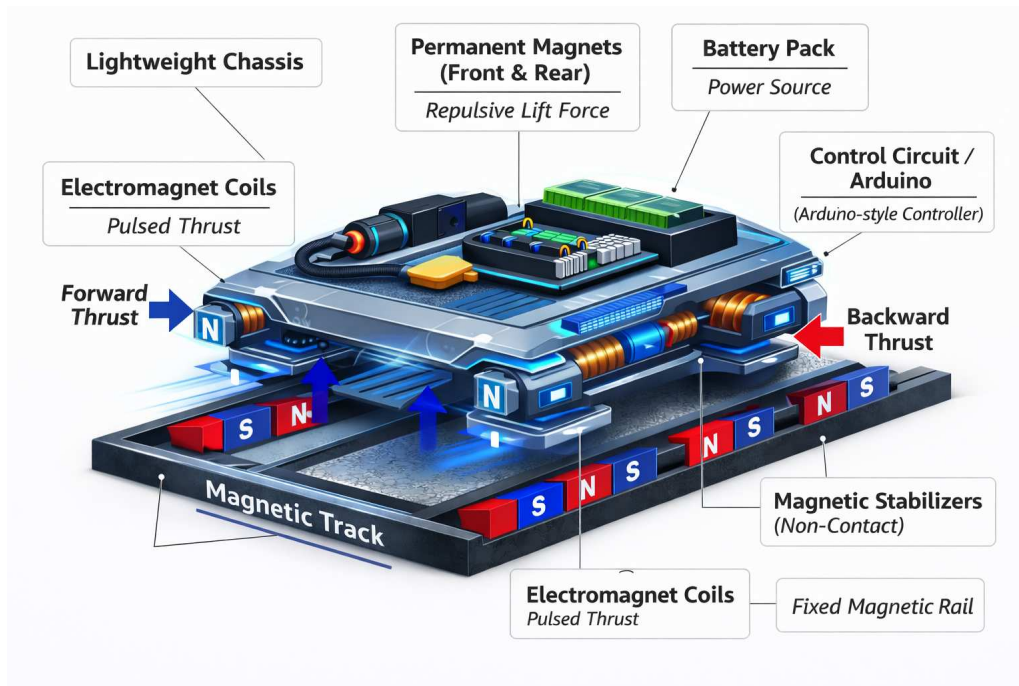


Figure 2: Interior component view of the magnetically-assisted vehicle based on Anushrut's Theory.

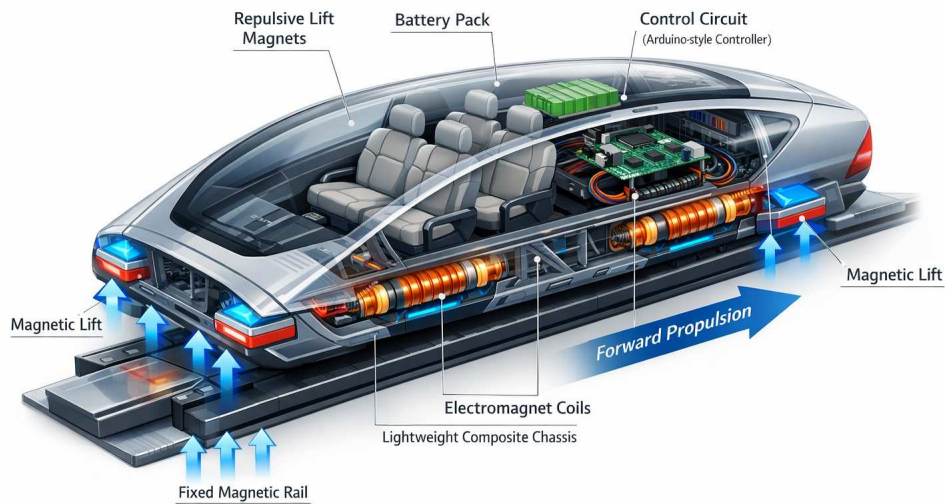


Figure 3: Exterior view of the magnetically-assisted vehicle based on Anushrut's Theory.